

## ATHS FC – Math Department Al Ain

Grade/Cluster	11 core	Date	6.5 to 6.8
Name	Answers	ID	

Q-1 Choose the correct answer:

a) What must be true in order for a term  $x - a$  to be a factor of a polynomial

$f(x)$ ?

- ☒ A.  $f(a) = 0$
- ☐ B.  $f(a)$  must be negative
- ☐ C.  $f(a)$  must be positive
- ☐ D.  $a$  must be positive

b) State the number of positive real zeros for the polynomial

$$f(x) = x^3 + 4x^2 + x + 5$$

- ☐ A. 2
- ☐ B. 3
- ☒ C. 0
- ☐ D. 1

c) Find the value of  $k$  so that the remainder of  $(x^2 + kx - 17) \div (x - 2)$  is 5

- ☐ A. 3
- ☐ B. -5
- ☐ C. -1
- ☒ D. 9

$$\begin{array}{r}
 2 \overline{) 1 \quad k \quad -17} \\
 \underline{2 \phantom{0} \phantom{0} \phantom{0}} \\
 1 \quad 2+k \quad 5
 \end{array}$$

$$\begin{aligned}
 4 + 2k + (-17) &= 5 \\
 2k - 13 &= 5 \\
 2k &= 5 + 13 \\
 2k &= 18 \\
 k &= 9
 \end{aligned}$$

d) What is the remainder of  $2x^2 - 33x + 16$  when divided by  $x - 16$ ?

- ☐ A. -1
- ☐ B. 1
- ☒ C. 0
- ☐ D. 1

$$\begin{array}{r}
 16 \overline{) 2 \quad -33 \quad 16} \\
 \underline{32 \phantom{0} \phantom{0}} \\
 2 \quad -1 \quad 0
 \end{array}$$

Q-2 Write the expression in quadratic form:  $x^6 + 2x^3 - 5$

$$(x^3)^2 + 2(x^3) - 5$$

Q-3 Show that  $x - 3$  is a factor of  $x^3 + 4x^2 - 15x - 18$  then find the remaining factors of the polynomial

from ~~Quiz~~ Quiz (4)

Q-4 State the number of positive real zeros, negative real zeros, and imaginary zeros of the function  $f(x) = x^3 - 6x^2 + 1$ . (3 marks)

from Quiz 4

Q-5 Find all of the zeros of each function (7 marks)

a)  $f(x) = x^3 + x$

From Quiz 4

b)  $f(x) = 4x^4 - 25x^2 + 36$

From Quiz 4

c)  $f(x) = 9x^5 - 94x^3 + 27x^2 + 40x - 12$

Degree 5  $\Rightarrow$  5 roots.

$p = \pm 12, \pm 2, \pm 6, \pm 3, \pm 4, \pm 1$

$q = \pm 1, \pm 3, \pm 9$

$\frac{p}{q} = \pm 12, \pm 4, \pm \frac{4}{3}, \pm 2, \pm \frac{2}{3}, \pm \frac{2}{9}$

$\pm 6, \pm 3, \pm \frac{1}{3}, \pm 4, \pm \frac{4}{3}, \pm \frac{4}{9}$

$\pm \frac{1}{9}$

$f(x) = 9x^5 - 94x^3 + 27x^2 + 40x - 12$

3 or 1 +ve real roots

2 or 0 -ve real roots

4, 2 or 0 imaginary roots

$$\begin{array}{r|rrrrrr} 3 & 9 & 0 & -94 & 27 & 40 & -12 \\ & & 27 & 84 & -39 & -36 & 12 \\ \hline & 9 & 27 & -13 & -12 & 4 & 0 \end{array}$$

$9x^4 + 27x^3 - 13x^2 - 12x + 4$

$$\begin{array}{r|rrrrrr} \frac{2}{3} & 9 & 27 & -13 & -12 & 4 \\ & & 6 & 22 & 6 & -4 \\ \hline & 9 & 33 & 9 & -6 & 0 \end{array}$$

$9x^3 + 33x^2 + 9x - 6$

Keep trying...

The Zeros are:  $3, \frac{2}{3}, -\frac{2}{3}$

$\frac{-3 \pm \sqrt{13}}{2}$

**Q-6 Application in ZOOLOGY:** A species of animal is introduced to a small island. Suppose the population of the species is represented by  $P(t) = -t^4 + 9t^2 + 400$  where  $t$  is the time in years. Determine when the population becomes zero

From lesson 6.5

Q48

check your copybook.

$-t^4 + 9t^2 + 400 = 0$

$t^4 - 9t^2 - 400 = 0$

$(t^2 - 25)(t^2 + 16) = 0$

$t^2 - 25 = 0$  or  $t^2 + 16 = 0$

$t^2 = 25$  or  $t^2 = -16$

$t = \pm 5$  or  $t = \pm 4i$

$-5, -4i, +4i$  not accepted.

after 5 years